**South Dakota Agricultural Education (AFNR)**

**Academic Integration Activities**

**ACTIVITY #5**

*Fundamental Animal Science students use data set comparisons to evaluate sire performance records.*

1. **Ag Standard**

Fundamental Animal Science, AN5.1: Recognize optimum performance for a given animal species.

* Identify reasons why some animals perform better than others. Evaluate sire performance records (EPD’s, ratios, pedigree and carcass data).

1. **Academic Standard**

9-12.S.1.2: Students are able to compare multiple one-variable data sets, using range, interquartile range, mean, mode, and median.

1. **Background Information**

Interquartile Range: the distance between the 25th percentile and the 75th percentile

Range: difference between the largest and smallest values

Mean: the average value

Median: the middle value

Mode: the value repeated more than any other (can be more that one)

1. **Example in Context**

Scenario: The Jacobson Ranch runs a cow/calf operation and a feedlot. They finish the calves on the ranch and sell them for market. Once processed, Mr. Jacobson reviews the carcass data to evaluate the bulls they used as sires the previous year. This year’s data shows a consistent trend of smaller than average rib eye area (REA). Mr. Jacobson has decided to purchase a new bull in hopes correcting the issue.

Which bull produced calves with the highest average REA? (mean)

Half of the calves produced by each bull have a REA of \_\_\_\_\_ or more. (median)

List the range of REA’s for each bull.

Based on the information above, choose the best bull for Mr. Jacobson. Why? Which pieces of information were most useful in making your decision?

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Calf 1 | Calf 2 | Calf 3 | Calf 4 | Calf 5 | Calf 6 | Calf 7 | Calf 8 | Calf 9 | Calf 10 | Calf 11 |
| Bulls |  |  |  |  |  |  |  |  |  |  |  |
| Thunder | 16.4 | 16.8 | 12.7 | 14.6 | 18.7 | 17.7 | 17.2 | 14.9 | 17.4 | 13.6 | 12.8 |
| Precision | 17.1 | 18.0 | 15.5 | 15.2 | 15.9 | 16.6 | 16.1 | 15.5 | 14.9 | 17.0 | 15.5 |

*Answer:*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Calf 1 | Calf 2 | Calf 3 | Calf 4 | Calf 5 | Calf 6 | Calf 7 | Calf 8 | Calf 9 | Calf 10 | Calf 11 | Mean | Median | Range |
| **Bulls** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Thunder | 16.4 | 16.8 | 12.7 | 14.6 | 18.7 | 17.7 | 17.2 | 14.9 | 17.4 | 13.6 | 12.8 | 15.7 | 16.4 | 6 |
| Precision | 17.1 | 18 | 15.5 | 15.2 | 15.9 | 16.6 | 16.1 | 15.5 | 14.9 | 17 | 15.5 | 15.9 | 16.1 | 3.1 |

*Best Bull: Precision because the average is higher. Range is also important because a large range could skew an average. In this case, Precision also had the smaller range as well.*

1. **Guided Practice Exercise**

Scenario: The Sanderson ranch sells their young calves to a backgrounder shortly after weaning them. The calves are sold by the pound, so a high weaning weight is desirable. Recently, one of their top bulls was injured and they are looking for a replacement.

Use the data provided in the table below to determine the following:

Which bull produced calves with the highest average weaning weight? (mean)

Half of the calves produced by each bull have a weaning weight of \_\_\_\_\_ or more. (median)

List the range of weaning weights for each bull.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Weaning Weight: | Calf 1 | Calf 2 | Calf 3 | Calf 4 | Calf 5 | Calf 6 | Calf 7 | Calf 8 | Calf 9 | Calf 10 | Calf 11 |
| Bulls |  |  |  |  |  |  |  |  |  |  |  |
| T-Rex | 540 | 550 | 495 | 535 | 575 | 560 | 560 | 530 | 545 | 570 | 595 |
| Solid Bet | 485 | 625 | 515 | 530 | 540 | 520 | 540 | 495 | 515 | 555 | 575 |

*Answer:*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Weaning Weight: | Calf 1 | Calf 2 | Calf 3 | Calf 4 | Calf 5 | Calf 6 | Calf 7 | Calf 8 | Calf 9 | Calf 10 | Calf 11 | Mean | Median | Range |
| Bulls |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| T-Rex | 540 | 550 | 495 | 535 | 575 | 560 | 560 | 530 | 545 | 570 | 595 | 550.5 | 560 | 100 |
| Solid Bet | 485 | 625 | 515 | 530 | 540 | 520 | 540 | 495 | 515 | 555 | 575 | 535.9 | 520 | 140 |

*T-Rex would be the best bull for the Sanderson Ranch because it has the higher average and a low range.*

1. **Independent Practice Exercises**

*Scenario: Flavor J Ranch purchases backgrounded calves to finish out and sell to packers. The feedlot manager uses yield grade data to determine how efficient they were in maximizing their return in investment on feed and the cattle themselves. He also uses the data to determine which sires they want to look for in the calves they purchase. The following yield grade data was available for calves from two bulls that sired calves in this last set of finished cattle.*

*Use the data provided in the table below to determine the following:*

*Which bull produced calves with the lowest average yield grade? (mean)*

*Half of the calves produced by each bull have a yield grade of \_\_\_\_\_ or less. (median)*

*List the range of yield grades for each bull.*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Yield Grade | Calf 1 | Calf 2 | Calf 3 | Calf 4 | Calf 5 | Calf 6 | Calf 7 | Calf 8 | Calf 9 | Calf 10 | Calf 11 |
| Bulls |  |  |  |  |  |  |  |  |  |  |  |
| Boris | 2.4 | 3.3 | 2.8 | 4.0 | 3.5 | 3.6 | 2.9 | 3.8 | 3.3 | 4.1 | 3.2 |
| Ajax | 3.6 | 3.1 | 3.0 | 2.8 | 2.6 | 3.0 | 2.4 | 2.9 | 3.8 | 2.6 | 3.2 |

*Answer:*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Yield Grade | Calf 1 | Calf 2 | Calf 3 | Calf 4 | Calf 5 | Calf 6 | Calf 7 | Calf 8 | Calf 9 | Calf 10 | Calf 11 | Mean | Median | Range |
| Bulls |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Boris | 2.4 | 3.3 | 2.8 | 4 | 3.5 | 3.6 | 2.9 | 3.8 | 3.3 | 4.1 | 3.2 | 3.4 | 3.3 | 3.3 |
| Ajax | 3.6 | 3.1 | 3 | 2.8 | 2.6 | 3 | 2.4 | 2.9 | 3.8 | 2.6 | 3.2 | 3 | 3 | 2.6 and 3 |

*Boris would be the best choice as he has a higher average. While his range is greater than Ajax, it’s not by enough to make a difference.*

1. **Notes**

None.